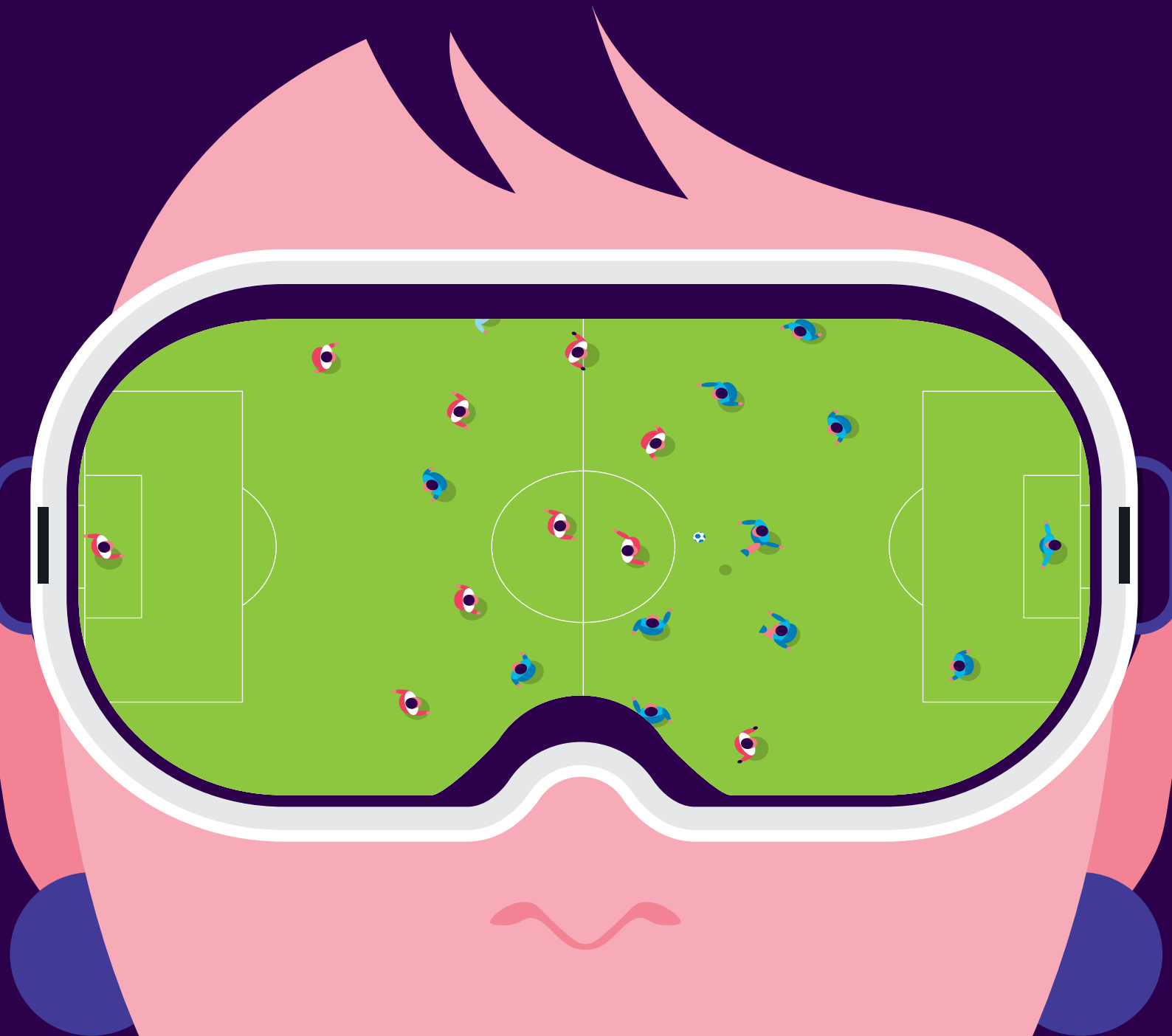# Emerging
technologies in sports
Reimagining the fan experience

Executive Summary

Technology is now an integral part of how fans consume sports

- Nearly 70% of fans state that the use of emerging technologies such as augmented and virtual reality, artificial intelligence, or biometrics has enhanced their overall viewing experience, both inside and outside the stadium.
- Fans from Asian geographies – including India, Hong Kong SAR, and Singapore – lead in the adoption and acceptance of emerging technologies in sports.
- Younger fans consume sports passionately, both in-stadium and via online digital channels.

The digitization of sport and the fan experience can strengthen engagement, building brand value and driving revenue growth

- A good experience with technology – either in or out the stadium – has a positive knock-on effect in terms of overall engagement.
  - Fans who enjoyed their tech-enabled experience said they would actually go to more physical matches at their team's stadium. They also said they would increase their spending on team/brand merchandise, food, and beverages at the stadium or on online subscriptions for watching matches.
  - We also found that fans who experienced emerging technologies during a recent visit to a stadium are more satisfied with their experience. Our research shows a 25-point NPS®[1] (Net Promoter Score) difference between fans who have experienced emerging technologies and those who have not.

To adopt and optimize emerging technologies in sports, organizations should focus on four areas:

- Reassure fans about how their personal data is used to build trust.
- Identify the needs and expectations of fans and users before deploying new technologies.
- Convert more casual fans into avid fans (fans who follow a sport regularly, watch nearly all matches of the sport they follow, and visit a stadium often to watch matches). Avid fans offer a significant opportunity, as they are more engaged.
- Build digital practices, capabilities, and transform organizational culture by investing in a digital culture, and skills, cross-sharing information across sports organizations to drive greater innovation.

"The best way to utilize technology has to be simple; it has to match with the coach and staff's needs and consumer expectations and trends."

Frédéric Longuépée,
chairman and CEO at Girondins de Bordeaux, a professional football club playing in the top French football division, Ligue 1

Introduction

Digital technologies are redefining the way sport is conducted and enjoyed. Data analytics and deep learning can be used to analyze players' performance and conduct pre- and post-match analyses. Computer vision and machine learning can help umpires and referees reach fair decisions and optimize camera angles during TV broadcasts. Augmented reality (AR) and virtual reality (VR) technologies can transform the fan experience.

While technology is playing an increasing role in athlete performance (see "Transforming performance"), it is the fan experience that offers a significant opportunity in terms of brand value and growth for the industry. Sport clubs and stadiums are making increasing use of technologies that transform how fans can feel part of the game. American Express partnered with Wimbledon to create an interactive, virtual reality-driven experience for fans where they can face-off with tennis star Andy Murray.[2] At the AT&T Stadium, home of NFL team the Dallas Cowboys, fans can take selfies with their favorite players. Using digital avatars of the players, AR allows fans to take selfies with their chosen players.[3]

To understand more about the impact of digital technologies on fans and on the future of sport, we surveyed 10,000 sports fans across nine geographies. We also conducted in-depth interviews with over 20 industry experts, sports athletes, and startup executives to understand more about the transformative impact of digital technologies (see the research methodology at the end of the paper for more details).

Based on that extensive analysis, this report examines three key themes:

- How technology has become a key part of how fans consume sports.
- The significant benefits on offer for multiple stakeholders if emerging technologies are deployed successfully.
- The strategies that organizations can use to deploy technology that inspires fans and builds engagement.

Transforming performance

Sports teams and organizations are adapting fast to the performance opportunity offered by new technologies. For example, Leatherhead FC, an English football club playing in the Bostik Isthmian League Premier Division, is making use of artificial intelligence to track players' performance, generate unbiased reports about individual players, and provide coaches with insight into the opposing team's players so that they can develop their match strategy.[4]
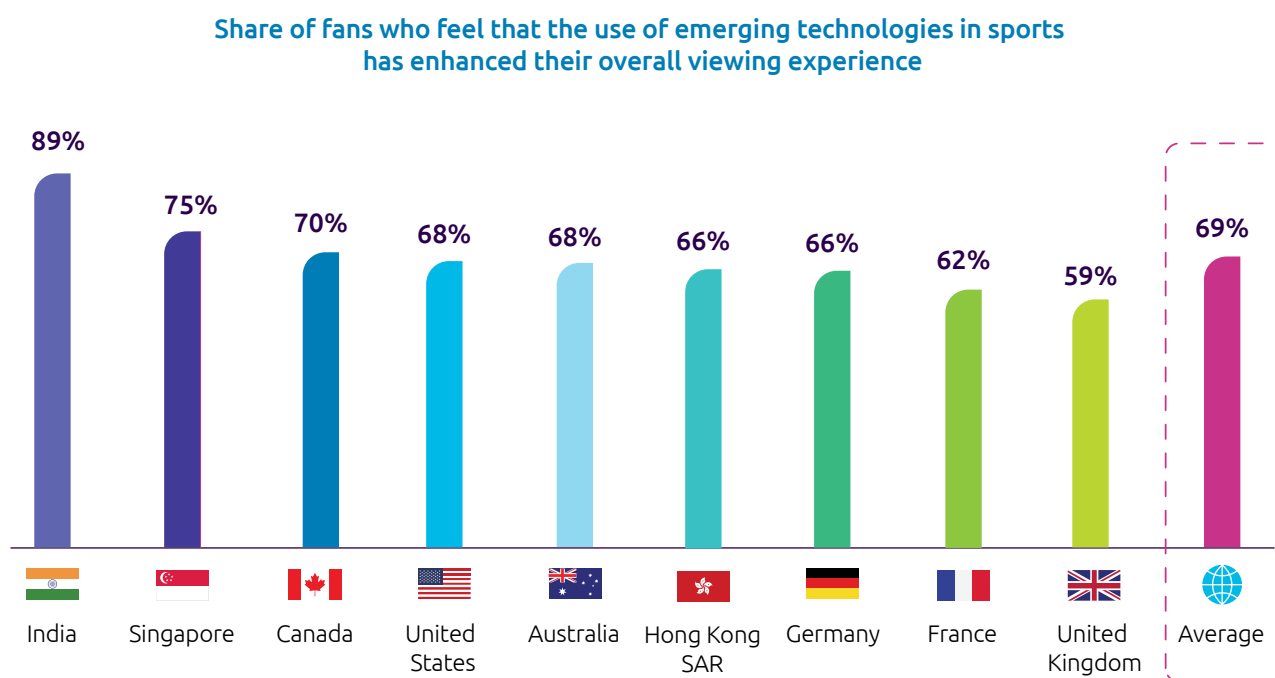
69%
The share of fans that report that the use of emerging technologies has enhanced their viewing experience – both inside and outside the stadium

Technology is now an integral part of how fans consume sports

Sixty-nine percent of fans report that the use of emerging technologies has enhanced their viewing experience – both inside and outside the stadium

As Figure 1 shows, fans across the world believe that emerging technologies are critical in enhancing their viewing experience. On average, over two-thirds of fans (69%) believe this to be the case.

Figure 1. Emerging technologies have enhanced the fan experience across geographies

Share of fans who feel that the use of emerging technologies in sports has enhanced their overall viewing experience

India	Singapore	Canada	United States	Australia	Hong Kong SAR	Germany	France	United Kingdom	Average
89%	75%	70%	68%	68%	66%	66%	62%	59%	69%

Source: Capgemini Research Institute, Emerging Technologies in Sports Research, Fan Survey, December 2019, N=10,363 fans.

The experience is being transformed both for fans watching performances live in a stadium and those who are accessing games from outside the stadium.

The in-stadium experience

Our research shows that increasing amounts of fans are using in-stadium technologies in a range of areas (see Figure 2):

- Getting regular updates on a mobile app while watching the match live
- Accessing Wi-Fi to share updates on social media
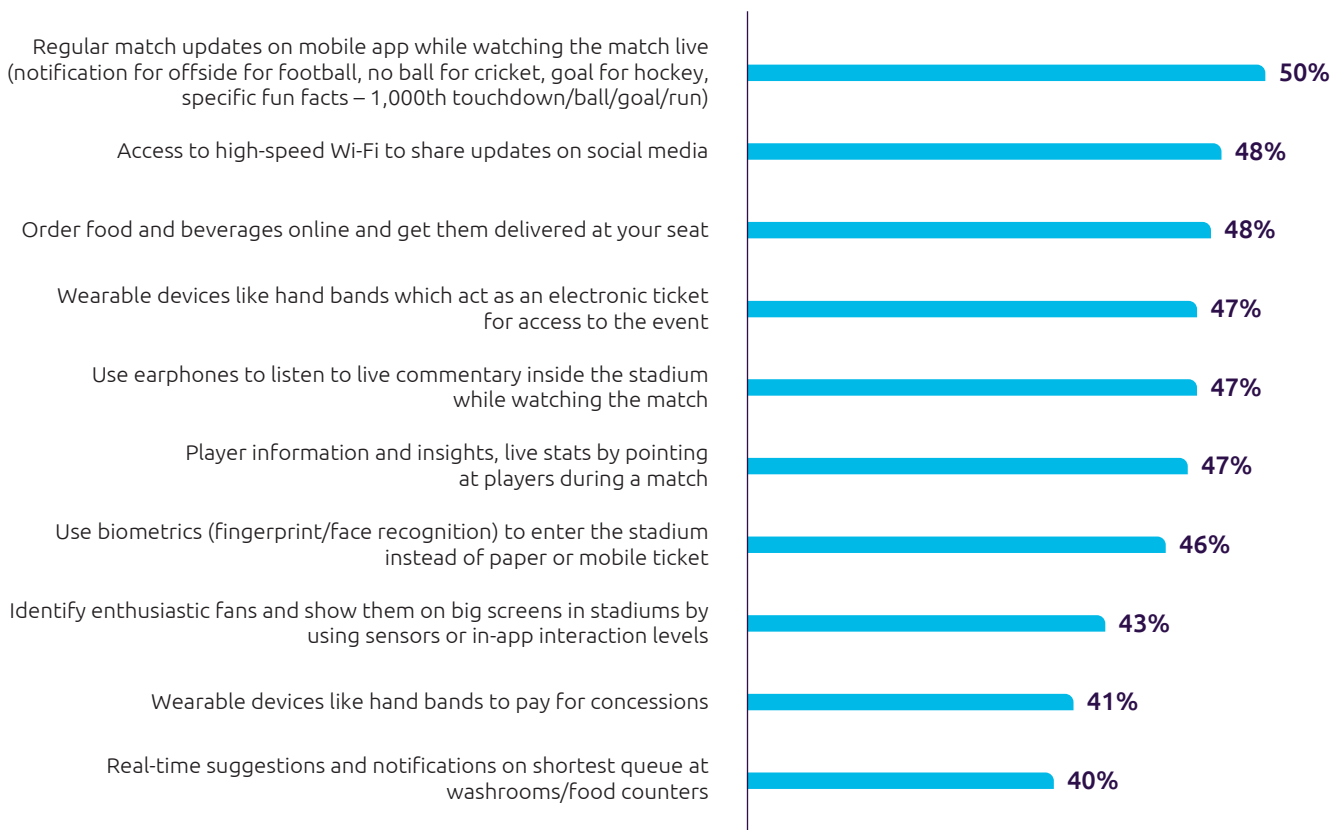- Order food and beverages online and for delivery to the seat.

50%

Share of fans who have experienced regular match updates on mobile apps while watching the match live in-stadium

Leading stadiums are deploying numerous technologies. The Mercedes Benz Stadium in Atlanta, designed for American football, is creating an optimal fan experience by deploying emerging technologies. The fan app comes in three different versions, one for Falcons fans, one for United fans, and one for general visitors. It has several features, such as delivering parking in real time, completely digital ticketing, access to team content, navigating the gigantic stadium, and finding what you want through use of AI.[5]

During Super Bowl 2018, fans' use of internet data increased by 70.9% compared to the previous year's use, mainly driven by web browsing, video streaming, social media use, and sports apps. Spikes in usage of data were observed during the halftime show, a crucial fumble by a player during the match, and the kickoff show.[6]

Figure 2. Top 10 in-stadium experiences of emerging technologies

Experience	%
Regular match updates on mobile app while watching the match live (notification for offside for football, no ball for cricket, goal for hockey, specific fun facts – 1,000th touchdown/ball/goal/run)	50%
Access to high-speed Wi-Fi to share updates on social media	48%
Order food and beverages online and get them delivered at your seat	48%
Wearable devices like hand bands which act as an electronic ticket for access to the event	47%
Use earphones to listen to live commentary inside the stadium while watching the match	47%
Player information and insights, live stats by pointing at players during a match	47%
Use biometrics (fingerprint/face recognition) to enter the stadium instead of paper or mobile ticket	46%
Identify enthusiastic fans and show them on big screens in stadiums by using sensors or in-app interaction levels	43%
Wearable devices like hand bands to pay for concessions	41%
Real-time suggestions and notifications on shortest queue at washrooms/food counters	40%

Source: Capgemini Research Institute, Emerging Technologies in Sports Research, Fan Survey, December 2019, N=10,363 fans, 9,008 fans who have visited the stadium.

The outside stadium experience

As Figure 3 shows, the most common experiences for fans using technology outside the stadium are:

- Streaming matches live on VR headsets to simulate the in-stadium experience
- Ability to choose different camera angles to watch the match
- Match prediction game where fans compete with an artificial intelligent bot.
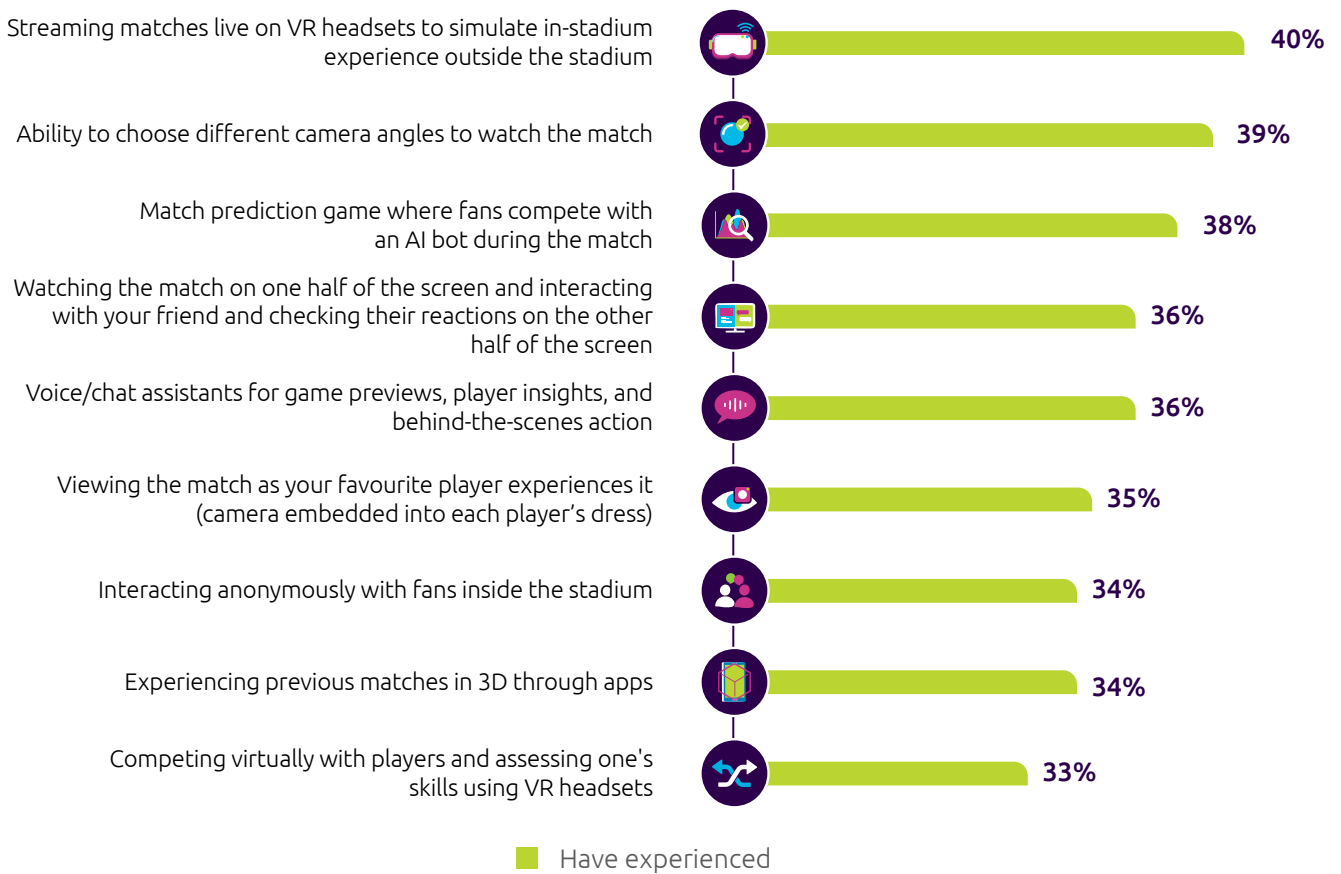
"I think the focus for the last few years, particularly in the US, has really been on augmenting the fan experience at home with new and different ways of consuming the broadcast, for instance, having different styles of commentary and having more stats on screen." says Ben Reynolds, CEO and co-founder, Spalk, providers of multiple personalized commentary options during live sports streams.

Fans of the New Zealand Rugby team can use Amazon Alexa-enabled devices to obtain match information, access behind-the-scenes content, learn more the team's history, and also play a quiz about the All Blacks team. The team partnered with a digital design agency to create this feature for increasing engagement with fans.[7]

FOX Sports teamed up with virtual reality tech company Next VR using Next VR's platform to allow fans to use VR headsets to stream NASCAR races, US Open Golf Championship matches, and Premier Boxing Champions. In turn, the platform gives sports bodies valuable insights into fans' viewing habits.[8]

Figure 3. Experiences of emerging technologies outside the stadium

	Have experienced
Streaming matches live on VR headsets to simulate in-stadium experience outside the stadium	40%
Ability to choose different camera angles to watch the match	39%
Match prediction game where fans compete with an AI bot during the match	38%
Watching the match on one half of the screen and interacting with your friend and checking their reactions on the other half of the screen	36%
Voice/chat assistants for game previews, player insights, and behind-the-scenes action	36%
Viewing the match as your favourite player experiences it (camera embedded into each player's dress)	35%
Interacting anonymously with fans inside the stadium	34%
Experiencing previous matches in 3D through apps	34%
Competing virtually with players and assessing one's skills using VR headsets	33%

Source: Capgemini Research Institute, Emerging Technologies in Sports Research, Fan Survey, December 2019, N=10,363 fans.

74%

Share of Asian fans that have experienced the use of emerging technology in stadium

By probing the survey data we collected, we can unearth a number of insights into adoption levels among fans. In particular, two notable findings emerged:

- Asian fans are enthusiastic adopters of sports technology.
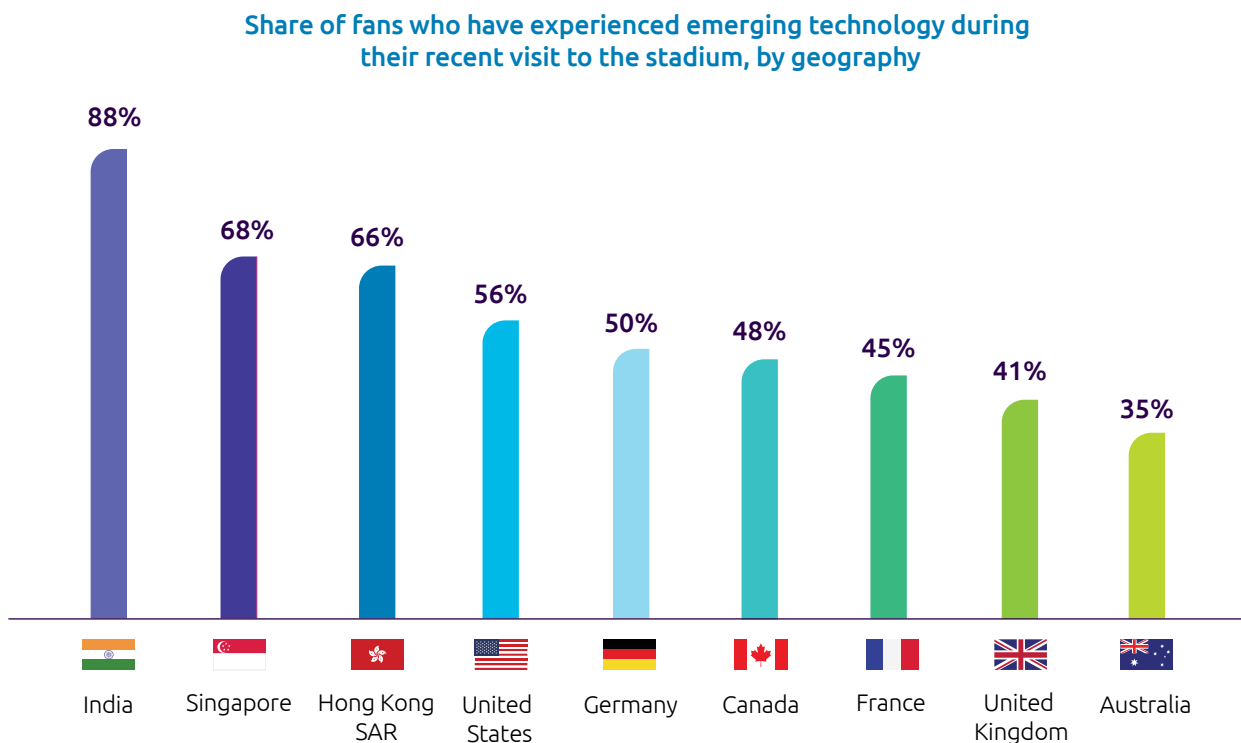- Younger fans are passionate consumers of sports.

Asian fans are ahead in adoption and acceptance of the use of tech in sports

The experience of sports technology is not uniform across the world. In our research we found that Asian fans trump other geographies in their adoption of digital technologies in sports. As Barbara Desmarest, vice president, sales and business development, VOGO, a company that provides in-venue live and replay experiences, suggested, *"Digital habits are very high in Asia as compared to Europe. In Europe, most sports actors like clubs, leagues, federations, and event organizers are still conservative and only starting to build their digital strategy and investing in fan experience tools. So, if you take any football club or rugby club here in Europe, most of the budget is used for the players. Thus, the budget left to bring a new app or a new technology for the fan experience can be very small. On the other hand, Asia is far ahead, where fans have access to easy to use applications."*

As we can see from Figure 4, close to three-quarters of Asian fans (74%) have experienced the use of emerging technology in the stadium, with India leading at 88%. However, this drops to 56% for United States and 50% for Germany, and below 50% for the rest.

Figure 4. Asian fans are much more likely to have experienced emerging technology in the stadium

Share of fans who have experienced emerging technology during their recent visit to the stadium, by geography

India	Singapore	Hong Kong SAR	United States	Germany	Canada	France	United Kingdom	Australia
88%	68%	66%	56%	50%	48%	45%	41%	35%

Source: Capgemini Research Institute, Emerging Technologies in Sports Research, Fan Survey, December 2019, N=7,292 fans.
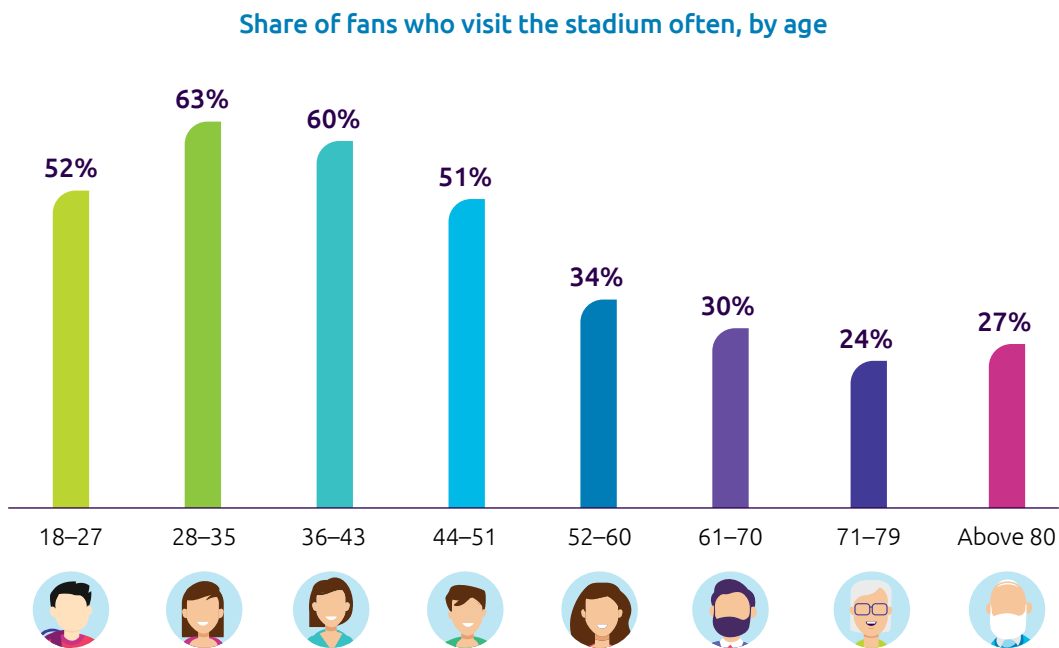
We also found that:

- When outside the stadium, Asian fans prefer to consume sports over digital devices (such as smart TVs and laptops) to a larger extent. We found that 80% prefer to watch sports over digital devices, compared to just 60% of European fans. Over three-quarters (78%) feel that the use of various technologies in sports has enhanced their overall viewing experience (compared to 66% of North American fans and 62% of European fans).
- 71% would be willing to pay more if new technologies enhanced their stadium experience, as compared to 40% of North American fans, 34% of European fans, and 33% of Australian fans.

Younger fans consume sports passionately, both in-stadium and via online digital channels

"In terms of the traditional supporters, they won't be dictated by the new technology. They will be dictated by the younger generation showing them and engaging and helping them understand why and what they're interested in. It will be the younger people who are chasing those different ways to experience the game who will bring along the older generation. So, the driver won't be the sport but the fact that the older generation would want to watch the sport with the younger generation." – Mike Friday, head coach, USA Rugby Sevens

The share of younger fans below the age of 35 who visit the stadium often is nearly 60% on average, as compared to 36% for the fans above the age of 35 (see Figure 5).

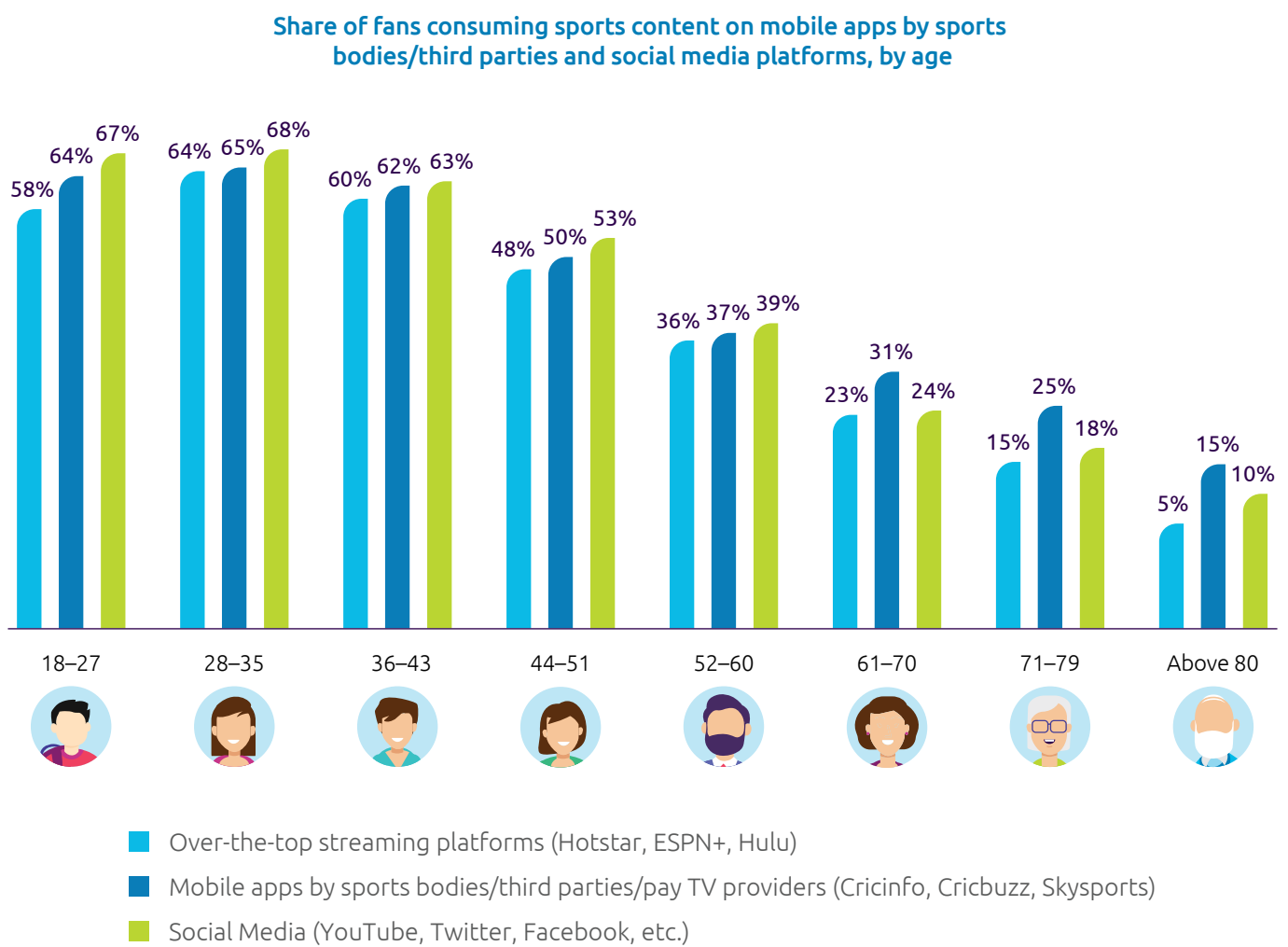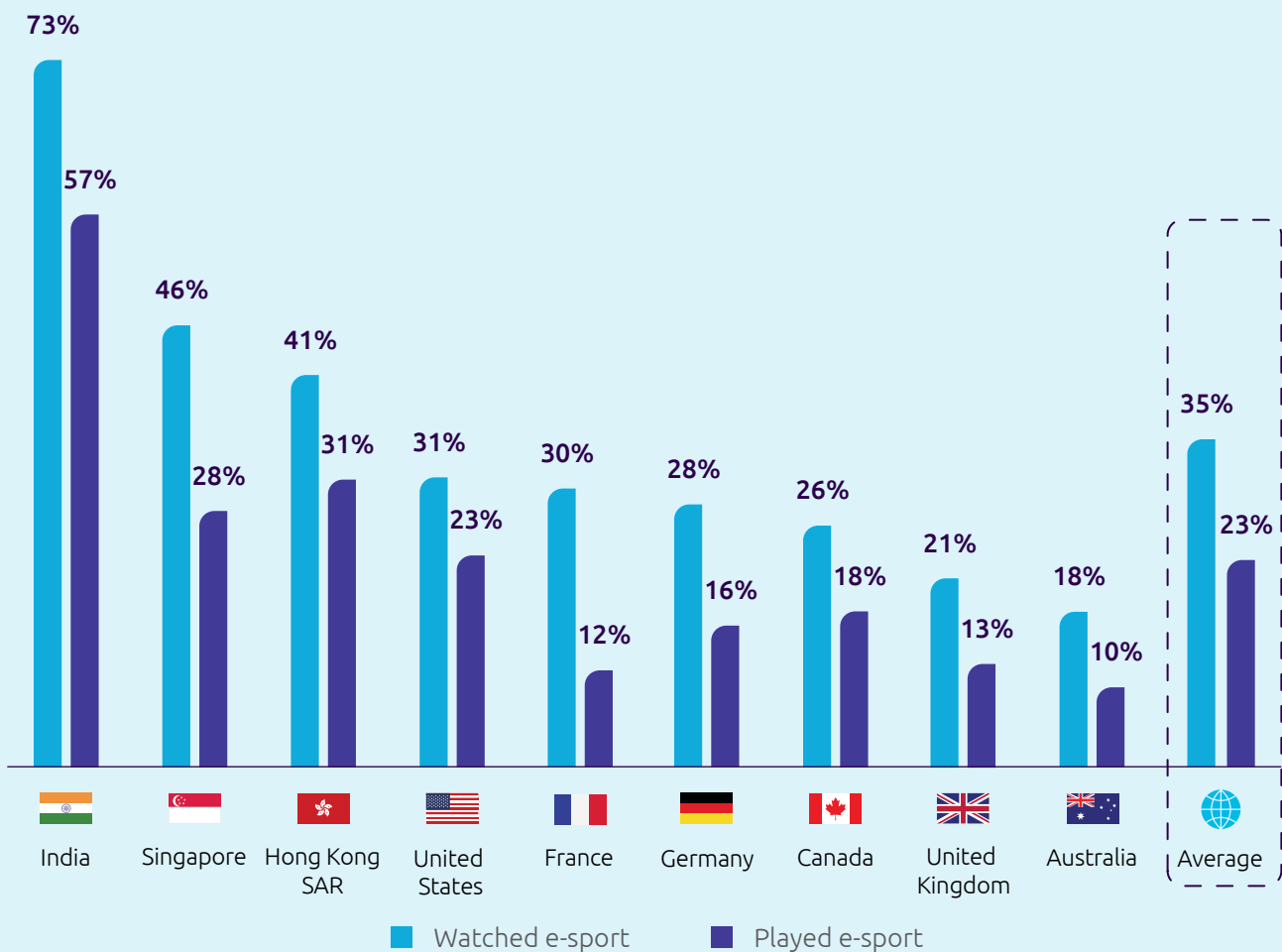**Figure 5**. Younger fans visit the stadium much more frequently than older fans

Share of fans who visit the stadium often, by age

18–27	28–35	36–43	44–51	52–60	61–70	71–79	Above 80
52%	63%	60%	51%	34%	30%	24%	27%

Along with visiting the stadiums, younger fans use smart devices extensively to watch games:

- Seventy-four percent of fans under 35 consume sports content on smart devices such as smart TVs, laptops, desktops, iPads, compared to 55% of fans over 35.

- On average, 66% of users under 35 use mobile apps by sports bodies/third parties and social media platforms to consumer sports content, as compared to 32% of users over 35 (see Figure 6).

Figure 6. A large share of younger fans consumes sports content on mobile apps

Share of fans consuming sports content on mobile apps by sports bodies/third parties and social media platforms, by age

	18–27	28–35	36–43	44–51	52–60	61–70	71–79	Above 80
Over-the-top streaming platforms	58%	64%	60%	48%	36%	23%	15%	5%
Mobile apps by sports bodies/third parties/pay TV providers	64%	65%	62%	50%	37%	31%	25%	15%
Social Media	67%	68%	63%	53%	39%	24%	18%	10%

■ Over-the-top streaming platforms (Hotstar, ESPN+, Hulu)

■ Mobile apps by sports bodies/third parties/pay TV providers (Cricinfo, Cricbuzz, Skysports)

■ Social Media (YouTube, Twitter, Facebook, etc.)

The younger fans, under 35, also enjoy watching matches at public places. On average, 67% of young fans watch matches in public places like restaurants or pubs compared to just 49% of fans over 35.

Industry disruption:
The rise of esports: 34% of sports fans have watched an esport, and 23% have played one

Esports is becoming an increasingly important part of the sports mix, allowing not just professionals but also amateurs to actively participate in sports. It is also creating new opportunities for traditional sports to grow their fan base and attract new audiences.

- As the figure below shows, esports are seeing increasing penetration in Asian geographies, including India, Singapore, and Hong Kong SAR.
- Of the fans who do watch, 73% use video streaming platforms such as Twitch, YouTube, ESPN, Mixer
- The younger segment is particularly enthusiastic: 53% of the 18–35-year-old group have watched esports, compared to 14% of those who are over 35:
  - Nearly 50% of fans below 35 feel that esports has increased their engagement with traditional sports. This average falls to 19% for fans over 35.

Asian geographies lead the way in watching and playing esports

	India	Singapore	Hong Kong SAR	United States	France	Germany	Canada	United Kingdom	Australia	Average
Watched e-sport	73%	46%	41%	31%	30%	28%	26%	21%	18%	35%
Played e-sport	57%	28%	31%	23%	12%	16%	18%	13%	10%	23%

■ Watched e-sport   ■ Played e-sport

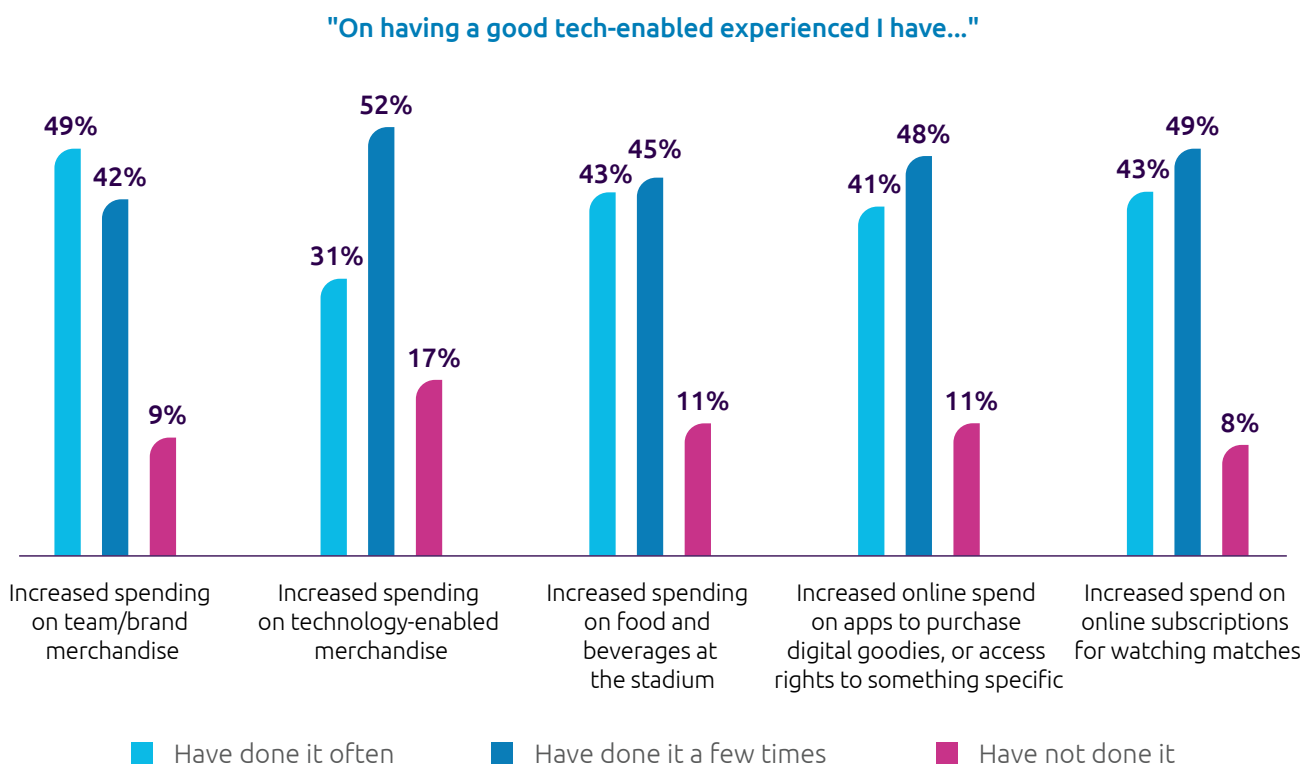**Source:** Capgemini Research Institute, Emerging Technologies in Sports Research, Fan Survey, December 2019, N=10,363 fans.

"Esports are a way of allowing more people to be involved in a sport because traditional sport, especially something like Rugby Sevens, is limited on certain physical factors. So, esports take that barrier to entry out and you are allowing people who otherwise wouldn't be involved in sports to be involved. However, with the rise of esports, the question of what values are there beyond winning and losing would also arise. And there is also the threat that young people will pull people away from traditional sports."

– Tom Mitchell, team captain, England Rugby Sevens

"There would be crossover between esports and traditional sports. One of the biggest things about team sport is group cohesion, group dynamic, and the ability to work well together under pressure in different environments. With esports, you could put a team in an esports environment, where they can try and hone their ability to work together as a unit and be tested in a pressurized environment."

– Ben Gollings, team coach, England Rugby Sevens

Effective use of emerging technology in sports represents a significant brand value and growth opportunity

Fans are not only engaging with emerging technologies when consuming sports, they are also willing to reward organizations that offer them a good tech-enabled experience.

Technology is driving sports consumption

When a fan has a good experience with technology – either in or out the stadium – it has a positive knock-on effect in terms of their overall engagement. For example, 56% of those who enjoyed their tech experience said they have gone to more physical matches at their team's stadium as a result, while 60% said they have increased the number of matches they stream online (see Figure 7).

Figure 7. Fan reactions following a positive experience with technology inside and outside the stadium

"On having a good experience with technology in sports inside and outside the stadium, I have…"

Increased the number of matches I watch on traditional TV channels	**66%**
Increased the number of matches I stream online	**60%**
Increased the teams/players updates I follow on websites and social media	**60%**
Increased the number of matches I attend in a stadium for the sports that I usually follow	**56%**
Encouraged my friends/family to attend more matches in the stadium	**54%**
Increased use of sports apps created by different sports organizations	**53%**
Increased my interaction with other sports fans	**53%**
Share the in-stadium positive experience in social media	**51%**
Started going for matches in a stadium for the sports that I don't follow	**47%**
Tried additional technologies/demos at the stadium	**45%**
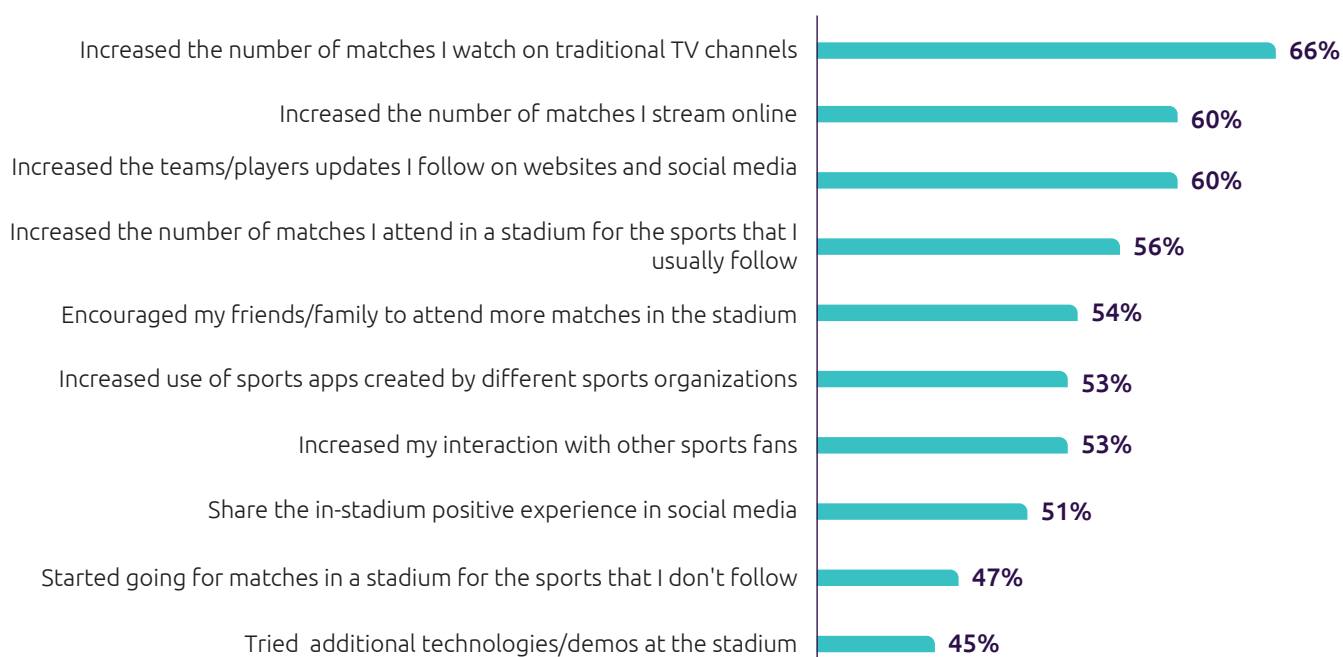
We also found that fans who have experienced emerging technologies during a recent visit to stadiums are more satisfied with their experience. Our research shows a 25-point NPS®[9] (Net Promoter Score) difference between fans who have experienced emerging technologies and those who have not.

And, as Figure 8 shows, a positive tech-enabled experience offers a significant commercial upside:

- Nearly half of fans (49%) said they have often increased their spending on team/brand merchandise following a good experience, and 42% have increased this spend a few times.
- 92% said increased their spend on online subscriptions for watching matches (either often or a few times).

Figure 8. Increase in spending by fans on having a good experience with technology inside and outside the stadium

"On having a good tech-enabled experienced I have..."

Legend: ■ Have done it often ■ Have done it a few times ■ Have not done it

In the following section, we examine the strategies that are key if industry players want to transform the fan experience, build engagement and trust, and seize the growth opportunity.

91%

Share of fans that have increased their spending on team/brand merchandise following a good experience

Transforming athlete performance through new technologies

Emerging technology is transforming how athletes perform, from tracking performance in real time to preventing injuries.

As we heard from Yasuto Suga, co-founder and CEO, Kadho Sports, a startup helping athletes improve their performance by combining neuroscience and technology, *"with metrics and data analysis, teams are starting to figure out that technology can have a strong impact but the difficulty for them is finding the ones that provide the right value. There are few bridging companies that can say these are your needs right now and these are the technologies you should be looking for."* Hence it is important for organizations to identify the right use cases for improving performance.

Tracking performance

The advent of smart clothing – fabrics that have smart sensors woven into them – is helping athletes track their performance in real time. These increasingly powerful sensors have the ability to track a wide range of bodily metrics, including heart rate and temperature, among others. Sensors are also making their way into sports equipment. For example, sports goods manufacturer Wilson has introduced a connected baseball that supports wide-ranging statistics and analytics.[10]

"Through data collected via wearables and sensors you are able to set objective benchmarks on performance," says Dugald Macdonald, Founder and CEO, Sportable, a sports data company, *"You're able to understand exactly how and why people are reacting in certain environments and you can then build up a profile of the players' performance. That profile is very important when you are looking to bring players up because, from a scouting perspective, the data sheds light on the key technical and tactical areas of the game."*

Across a number of sports, players are increasingly relying on virtual reality tools to enhance their abilities. For instance, many teams in the NFL use technology from immersive technology startup STRIVR. Players can use the technology to practice their moves and repetitive drills in a realistic environment wherever they are and regardless of the weather outside.

Sports clubs and teams have, in recent years, made significant inroads into the use of data analytics for tracking performance and making strategic decisions. *"In professional sport, the difference between a win and a defeat is really thin and the good use of data could do the twist. But we are just at the beginning of our understanding of how to use data,"* says Grégoire Potton, former chief executive officer, Red Star FC – the French football club. *"Data gives you options and it makes your choice easier, but it is important to remember that it is a tool and the question is what to do with the data and how to use it. And the problem is that some crucial things in sports are very difficult to capture with data. For instance, the mental strengths of the player, the team chemistry, etc. are difficult to collect and analyze."*

Injury prevention and management

In recent years, both players and sports organizations have increasingly turned to emerging tech to tackle injuries, drawing on data analytics. For instance, the NFL has partnered with Amazon Web Services to use their AI and machine learning services to study injuries and improve player safety. In addition, RFID chips in the shoulder pads of players capture a variety of data, including a player's precise position, speed, and direction of their movement. Matt Swensson, vice president of emerging products and technology for the NFL says, *"We're taking in so much data now with the tracking system that we're able to use machine learning to understand what elements are relevant and what are not."*[11]

Multiple startups have launched smart wearables targeting athletes. For instance, Fathom AI recently released a wearable that uses AI and the athlete's biodata in building highly customized recovery routines, helping mitigate the chance of injury. The device includes three sensors that are no more than sticker-sized but able to capture as many as 100 variables.[12] Other startups are developing solutions based on pattern recognition – building on an athlete's past performance and medical history to help keep injuries at bay. Tal Brown, co-founder and CEO of Zone7, a sports tech startup, says, *"Injuries in professional sports cost billions annually, but in the era of big data it doesn't have to be that way."*[13]

"Technologies help the welfare of the athlete by showing them what they are putting their body through and how to support recovery," explains Ben Gollings, team coach, England Rugby Sevens. *"The technology can show how much the rigor the body has been put through and how important it is to the athlete to be conscious of these side of things. And so, I think from that perspective as well, it's a massive advancement."*

How emerging technologies are helping players

"In athletics, the use of tech has been very useful. Earlier, a coach would tell you what you were supposed to do on the basis of your age or ability. Through the use of tech, a system can run advanced tests, analyze, and share increasingly accurate outputs about what you can and cannot do. Athletes can trust this more because this is more factual."

Amanda Ouedraogo, athlete

Image source: ACU athletic

"The use of virtual reality in reviewing training sessions and matches can have a big impact on sports. At the moment, we use a very simple video analysis. However, if you can put yourself in a given situation instead of just reviewing a match by watching a video, then the learning and reviewing experience becomes much more real. If you are able to be in that situation again, either through VR or another technology, it would be a massive step up in terms of the reviewing and learning experience."

Tom Mitchell, team captain, England Rugby Sevens

"With performance capture technology, I was able to work more independently without relying too much on my coach, especially when it came to accuracy. I was able to use gather feedback on my accuracy for every single shot through the data provided by the system."

Jasmine Yeong-Nathan, former national ten-pin bowler, Singapore

Source: abf-online

"Technologies such as VR/AR should help athletes train in game conditions. The focus shouldn't only be on sight sense but also on touch (gripping the ball), sound (atmosphere in the stadium) and smell (humidity, grass, etc.) sense."

Jonathan Laugel, Rugby Sevens athlete, France

Photo credit: INIGO BROTHERS,

"I think the biggest thing that has massively progressed in the women's game over the last probably five to six years is the GPS. Being able to track a player just gives you a real insight into your training intensities and whether you are able to sustain certain training levels as high as you would need in a match. Previously, I remember my stats would come to me on a bit of paper, where somebody had just watched the game and written tallies down next to what I had done involvement wise. But, you could never measure distance or speed or impacts and it is those factors that tell the story for you in terms of performance."

Rachael Burford, English Rugby Union player
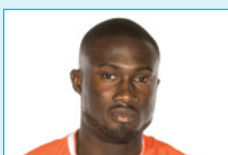
"I think IoT and the use of data is really going to be the key in the next few years. These innovations will have a huge impact on athlete performance and will forever change the standard and the way we define professional sport. This is a new step that will allow players to train more efficiently, anticipate the injuries and have a better recovery between competitions."

Pape-Phillipe Amagou, professional basketball player, France

Unlocking the value of emerging technologies in sports: match-winning strategies

> *"Recent innovations in football have revolutionized the way we talk about and watch matches. I feel like matches have become more exciting and are packed with more action and drama as a result."*[14]
> −Robert Pirès, coach and former player with Arsenal football club

Based on our extensive research – and our conversations with industry experts, startup executives, and sports professionals – we believe there are four areas that organizations should focus on to adopt and optimize emerging technologies in sports.

Reassure fans on the use of personal data

Data on an individual plays a critical role in enhancing the viewing experience – both inside and outside the stadium – as it allows you to personalize the experience. As *"Fan data is*

the most valuable asset," says Giles Morgan of G. D. Morgan, an international sports advisory business. *"It is the basic unit of currency that enables sports to commercialize and what makes sports valuable. But it is this opportunity for the global sports industry that currently stands unrealized."*

Realizing this opportunity, however, faces a significant challenge. Our survey research found increasing concern among fans about the indiscriminate use of personal data within the in-stadium experience. In previous research that we have conducted into this issue, we showed that gaining consumer trust depends on building the principles of data protection and into the organizational culture.[15] One of the biggest challenges for consumers in their in-stadium experience is discomfort with the collection of personal data and its storage. This was cited by close to two-thirds of respondents (65%), and, as Figure 9 shows, it's a top-of-mind concern for consumers, outranking other challenges, such as stadium Wi-Fi being suboptimal.

Figure 9. Challenges faced by fans in their in-stadium, digital-enabled experience

What are the challenges you face in your digital enabled experience inside the stadium?

Challenge	%
I am uncomfortable with the collection of personal data and its storage	65%
Unable to access internet in the absence of strong network connectivity and stadium Wi-Fi	53%
Digital technologies available to enhance experience don't function properly and are not effective	51%
The digital technologies used at stadiums are intrusive and distract me from focusing on the actual game	50%
Digital technologies used at stadiums are not user-friendly	49%
Notifications and alerts related to match statistics, food and beverages are not timely and not personalized	47%

Source: Capgemini Research Institute, Emerging Technologies in Sports Research, Fan Survey, December 2019, N=10,363 fans, 9,008 fans who have visited the stadium.

> "It's getting the balance right between gathering information and using technologies to get further insights on something that is relevant as opposed to just gathering data for the sake of gathering data,"

Marc Douglas, World Rugby

For Marc Douglas of World Rugby, the governing body of Rugby Union, this means organizations should ensure data collection is not indiscriminate, and focused on what is important. *"It's getting the balance right between gathering information and using technologies to get further insights on something that is relevant as opposed to just gathering data for the sake of gathering data,"* he says.

Across various tech-enabled experiences, consumers are uncomfortable with sharing their personal data. One in two said they were not comfortable with the use of biometrics to gain entry to the stadium. Close to half (46%) are not willing to share personally identifiable data, such as their social security number, in return for a tailored experience specific to their preferences.

Ben Ryan, former head coach of the National Sevens rugby team in Fiji, believes that consumers will become increasingly willing to share data as they become progressively more used to the use of new technologies. *"The key challenge is changing people's traditional views,"* he says. *"You might not be able to do all the changes at once, you might have to do it a bit slower and when people can see the benefits, then they would be willing to adopt more changes and share more data. Anything new is always going to have some skepticism around it."*

To build consumer trust in how their data is being used, sports organizations can focus on a number of steps:

- Seek consumer consent: while seeking consumer consent may not be a legal requirement everywhere, it can go a long way in building consumer trust. In can be particularly helpful in building trust and acceptance in areas such as biometrics or collecting personal identifiable information.
- Be transparent about the use and protection of consumer data and share with fans the steps that are being taken to protect their data: this also involves building consumer awareness on the kind of data being collected and how it is used.
- Demonstrate the value that consumers stand to gain with this data exchange.
- Share incentives where applicable: our previous research found that consumers expect organizations to incentivize them for sharing their personal data. The report found that, on an average, more than seven out of ten consumers expect incentives in the form of better deals/offers and priority services.[16] Sport organizations could also to explore incentivizing sports fans in exchange for their data.

Identify user needs before investing in and deploying new tech

In our conversations with industry leaders, one thing that stood out is the need to deploy tech not just for the sake of deploying it. Organizations need to understand how a technology meets fans' expectations, what the ROI potential is, and whether services are sustainable. *"The best way to utilize technology has to be simple; it has to match with the coach and staff's needs and consumer expectations and trends."* said Frédéric Longuépée, chairman and CEO at Girondins de Bordeaux, a professional football club playing in the top French football division, Ligue 1.

This requires that you map out and understand the needs and expectations of fans, identify which technologies can support those expectations, and then curate experiences that significantly enhance the overall fan experience. This requires a close focus on the user experience design for the technology being deployed, including the hardware implications for end users. *"Organizations need to decide what platform and what content they need to create for it, because if users are not where you are, other competitors will take care of them."* says David Goncalves, partnership manager at LiveLike, a company that builds immersive technologies to watch sports content. *"One way could be to deploy emerging technologies on devices that consumers already use, by creating an immersive experience that improves on the existing experience that is available on the fan's device and connects viewers and your content."*

At the moment, how fans' expectations are met is patchy, but 5G offers a significant opportunity

Our research found that, currently, end users are not content with the experience they receive from some of the emerging technologies being deployed. When we analyzed a number of tech use cases deployed inside and outside the stadium – such as biometrics or high-speed Wi-Fi – we found a significant degree of dissatisfaction. Inside the stadium, fans reported the highest dissatisfaction in their experience in the use of biometrics to enter the stadium (cited by over a third of respondents – 35%).

On the other hand, over three-quarters of fans (78%) said they were satisfied with access to high-speed Wi-Fi and the ability to therefore share updates on social media, inside the stadium. Given that hi-speed internet connectivity is critical to the in-stadium fan experience, networks and connectivity need close

research we have conducted demonstrates 5G's advantages over previous generations, such as:

- Enhanced mobile broadband speed and increased capacity
- The ability to support a high density of devices (key to the in-stadium environment)
- A new architecture, which is more open to third parties (partners, developers, service providers) via APIs.[17]

The deployment of 5G in stadiums could be key to transforming the fan experience. It could enable, for example:

- Better VR capabilities, which are seen today as being of limited quality

- Enhanced in-stadium infrastructure allowing for fans to sign up to new micro-services
- Increased social media traffic driving greater online engagement.

As well as a compelling in-stadium experience, fans also need to feel that they are getting value from the out-of-stadium digital experience. Outside the stadium, fans reported the highest dissatisfaction in their experience of streaming matches live on VR headsets (31% of respondents). Sports organizations need to tap into the huge audience that sits outside the stadium and consumes sports through a variety of other digital mediums and enable greater fan experience for these fans as well.
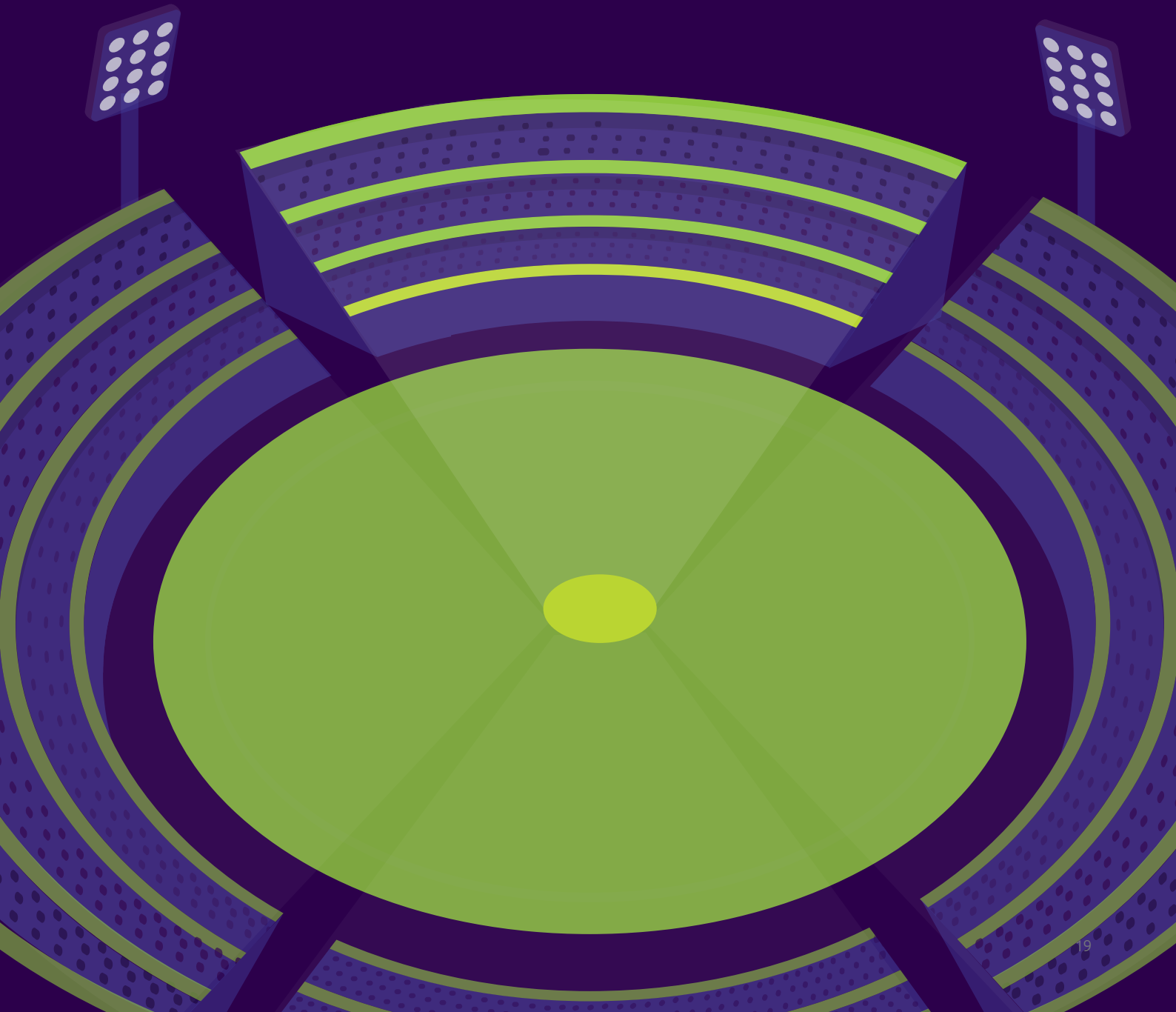
Technology and sports performance: the industry's voice on key challenges

Sports organizations

"The increasing availability of sports technologies gives performance analysis within sporting organizations the real opportunity to find technology that is aligned with their vision and ideas. One of the key and important aspects of this emerging technology is that it must a flexible in order to be able to tailor to the users' needs, especially if this technology is directed towards effecting the team and staff."
-Luke Benstead, head of performance analysis and innovation, Royal Belgian Football Association

Players

"A challenge from a player's perspective is the accuracy of these technologies. So, with a new technology, the biggest question is how accurate is the tracking or measurement? For example, broadcasters use speed tracking and if the speed tracking being shown to the viewers is not accurate, that could seriously damage the reputation of a player."
Tom Mitchell, team captain, England Rugby Sevens

"I think one of the things that I experienced was, after every shot … I will come back, look at the data, and analyze, and this was on repeat for hours at a time. Slowly, I became more focused on the data and feedback that was readily available to me, which made me very result-oriented during practice. However, what I required during competition was the exact opposite, I needed to be focused on the process. So, I think because data gives you a lot of opportunity to analyze, there is also a chance to over analyze things. It is a fine line between both, and as an athlete it is important to be self-aware to make sure you're able to draw that line during practice and competition."
Jasmine Yeong-Nathan, former national ten-pin bowler, Singapore

"You have to find the right balance between using technology in your professional athlete life and the natural way of playing your sport. What makes a coach good is the feeling that he has, and technology can't replace a real coach. So, the challenge will be finding the right balance between using technology for the athletes, trainers, head coaches, and still keeping the basics of professional sports."
Pape-Phillipe Amagou, professional basketball player, France

Convert more fans to "avid" fans

We wanted to understand which fans in our research could be considered the most committed. This would allow us to separate out those who have strong engagement with their sport and who are more likely to reward the organizations they follow. We therefore segmented the fans who responded to our survey into "avid" sports fans and the rest. We define an avid fan as someone who:
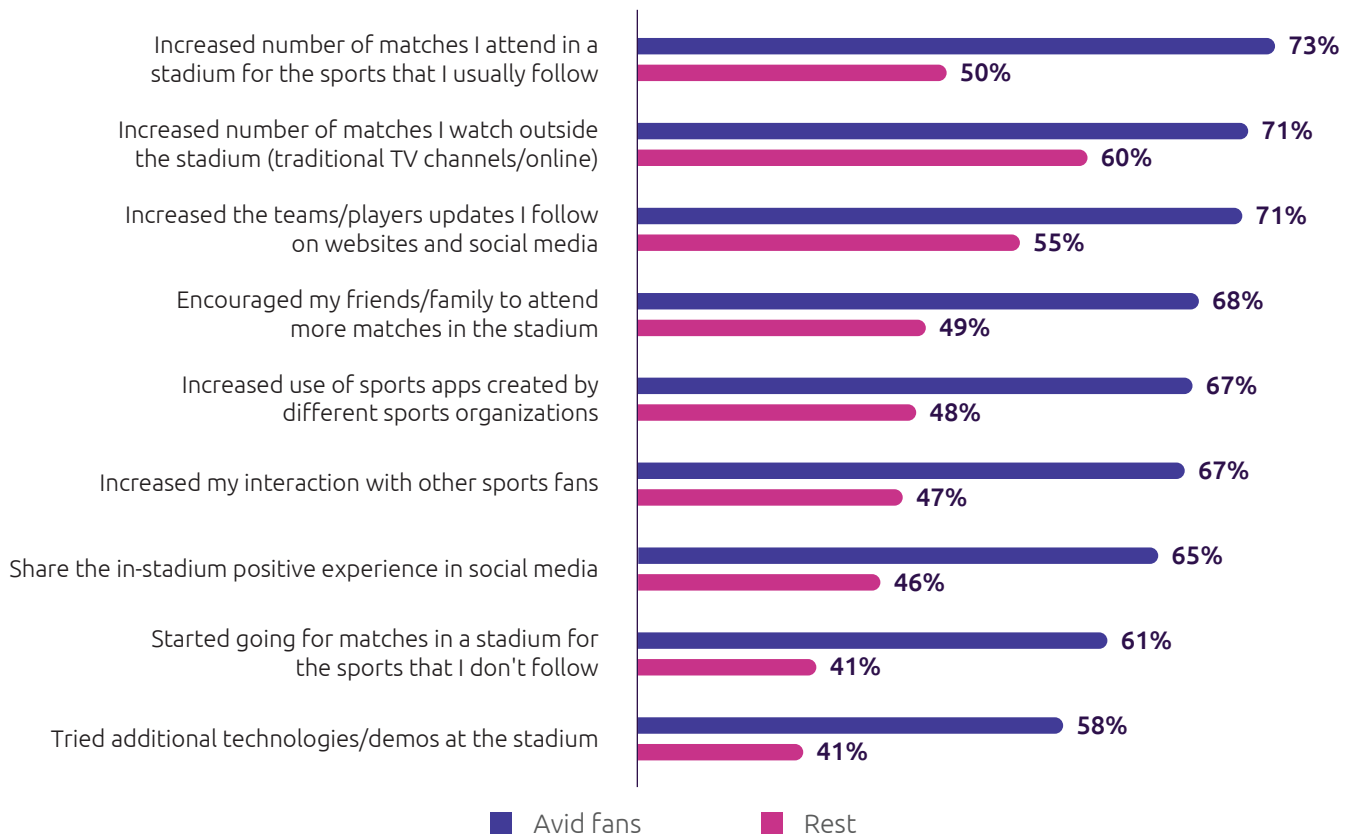
• follows a sport regularly
• watches nearly all matches of the sport he/she follows
• visits a stadium often to watch matches (see "Understanding avid sports fans" for more information on this cohort).

Around a quarter (27%) of the fans in our survey are "avid." These are an attractive segment, as Figure 10 shows. Avid fans generate more business and positive word of mouth on having a good tech-enabled sports experience. For example, 73% of avid fans attend more matches following a good tech-enabled experience, compared to 50% of the rest. Duncan Alexander, chief data editor, Opta, outlines how technologies have played a key role in strengthening bonds between fans and the teams they follow. *"Social media has played a big role in really engaging fans with clubs,"* he says. *"They have this kind of constant conversation with their supporters and I think that builds a bigger bond between the fans and the club, which theoretically should lead to people deciding to go to the games more often."*

Figure 10. Avid fans increase their engagement with the sport to a greater extent than the rest of the fans

"On having a good experience with technology in sports inside and outside the stadium, I have…"

Avid fan vs Rest

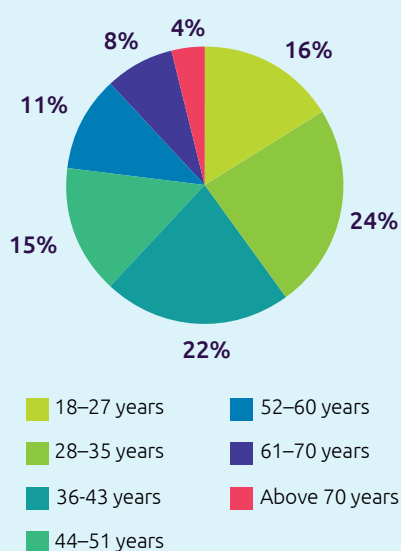|	Avid fans	Rest
Increased number of matches I attend in a stadium for the sports that I usually follow	73%	50%
Increased number of matches I watch outside the stadium (traditional TV channels/online)	71%	60%
Increased the teams/players updates I follow on websites and social media	71%	55%
Encouraged my friends/family to attend more matches in the stadium	68%	49%
Increased use of sports apps created by different sports organizations	67%	48%
Increased my interaction with other sports fans	67%	47%
Share the in-stadium positive experience in social media	65%	46%
Started going for matches in a stadium for the sports that I don't follow	61%	41%
Tried additional technologies/demos at the stadium	58%	41%

■ Avid fans   ■ Rest

Source: Capgemini Research Institute, Emerging Technologies in Sports Research, Fan Survey, December 2019, N=10,363 fans, 2,816 avid fans.

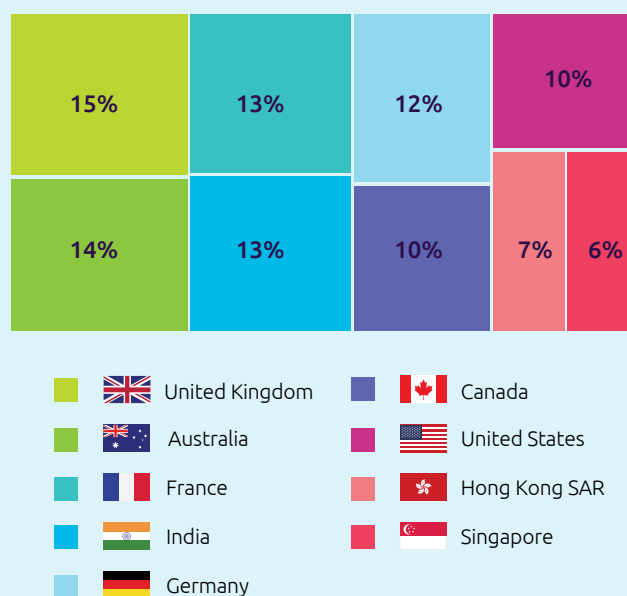# Understanding avid sports fans

More than 60% of avid fans are under 44 years old

Share of avid fans, by age

- 18–27 years
- 28–35 years
- 36-43 years
- 44–51 years
- 52–60 years
- 61–70 years
- Above 70 years

16% | 24% | 22% | 15% | 11% | 8% | 4%

Nearly 40% of avid fans belong to Europe

Per geography, share of fans who are "avid"

| 15% | 13% | 12% | 10% |
| 14% | 13% | 10% | 7% | 6% |

- United Kingdom
- Australia
- France
- India
- Germany
- Canada
- United States
- Hong Kong SAR
- Singapore

Source: Capgemini Research Institute, Emerging Technologies in Sports Research, Fan Survey, December 2019, N=10,363 fans, 2,816 avid fans.

From our analysis of avid fans, we found that:
- Fifty-seven percent of this group is based in urban areas.
- More than 60% of the avid fans are men.
- More than 50% of avid fans earn above $60,000 per year
- The top sports followed by these avid fans are soccer/football, tennis, and basketball.

- Avid fans are comfortable with technology
    - Ninety percent of avid fans are well versed in technology (including 41% who consider themselves extremely tech savvy and keep themselves updated about the latest technologies)
    - Avid fans are more comfortable with the use of emerging technologies technology inside and outside the stadium.

- Nearly three-quarters of avid fans watch a match in the stadium when their favorite team is playing and over a third (43%) go to the stadium every time the matches are being held in their city.

- Apart from watching matches, avid fans engage with their favorite sports team/players by:
    - Following their updates on a mobile app (64%)
    - Purchasing their favorite team's merchandise (49%)
    - Engaging with other fans and sharing opinions in online discussion forums/social media (49%).

Sports organizations could look to some of these characteristics and patterns of behavior to understand how they could enhance the fan experience for the rest of the consumers. As we have seen, for example, avid fans are comfortable with technology. Barbara Desmarest, vice president, sales and business development, VOGO, points out that technologies like real-time video feeds can transform the experience for all fans, and repay the effort that fans make in attending matches. *"In most of the stadiums in Europe, attendance is not 100% for every match,"* she says. *"So, the biggest challenge is to get people in the stadium. It is our job to make it worth the effort of getting in your car, finding parking at the stadium, arriving early to go through security control before taking your seats and enjoying the match, and maybe spending some more time after the match before heading home. And for this we really need to offer them an exclusive experience."*

To turn non-avid fans into avid fans, organizations need to think through a few core areas:

- Defining a digital fan experience and how it could be seamlessly integrated into the overall fan experience. For this, the digitally enabled experiences of fans need to be a key part of the overall fan attraction, retention and engagement strategy. To attract a targeted fan base, organizations also need to think about different audience and their needs. As we heard from Emmanuelle Roger, co-founder and chief executive officer of Immersiv, a company that builds immersive technologies for viewing sports, *"younger fans are looking for multi-screen and interactive experiences. If we're able to provide such experiences in the stadiums, that's something that will drive further, the attendance to the stadium for younger fans."*
- To attract more fans, stadium operators, sports associations, and sports organizations need to work towards focusing on and deploying and communicating about those technologies that bring the greatest engagement.
- Organizations can strive to offer "hyper-personalized" experiences and content for the fan, driven by in-stadium and tournament-related data (i.e., who is at the tournament, what they do, interests they exhibit,

teams they follow). As organizations learn more about the preferences of fans, they can push relevant content through multiple channels, from advertising to social media.

Build digital practices, capabilities, and transform organizational culture

Organizations also need to align themselves internally around the emergence and increasing use of technologies. This means building the capabilities and culture needed to embrace and drive value from emerging technologies.

Organizations need to invest time and resources in supporting the shift towards a technology/digital-driven culture – characterized by innovation and disruption – and also upskill their people in new technologies where needed. An organization's people need to be curious about use cases in other sports (or even industries), identifying those that could translate nicely for their own fans. This is a good way to be disruptive. This also involves sharing information across sports organizations for greater innovation. As we heard from Luke Benstead, head of performance analysis and innovation, Royal Belgian Football Association, *"If sporting teams and organizations don't come together to share innovation, workflows and working practices of the industry, sectors, or departments, our sports will not progress at the rate that is needed."*

Getting value out of the rich data offered by new technologies is also key. This requires the right skills but also a groundwork of robust data management. Our recent research on AI, for example, set out the data management practices that are critical to ensure the accuracy, robustness, and quality of data.[18] Organizations need to think about how it is collected, stored, combined with other data, and analyzed for insight. Organizations can use the combination of rich data and emerging technologies to explore new business models, not only as a sports organization but also as an entertainment brand.

"Younger fans are looking for multi-screen and interactive experiences. If we're able to provide such experiences in the stadiums, that's something that will drive further, the attendance to the stadium for younger fans."

Emmanuelle Roger, co-founder and chief executive officer, Immersiv
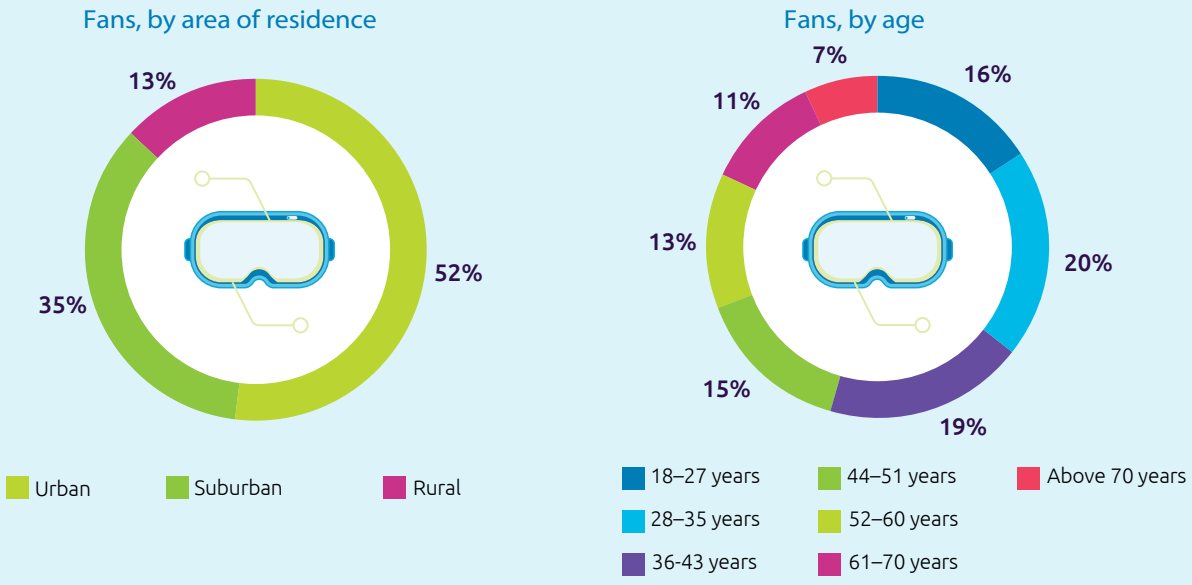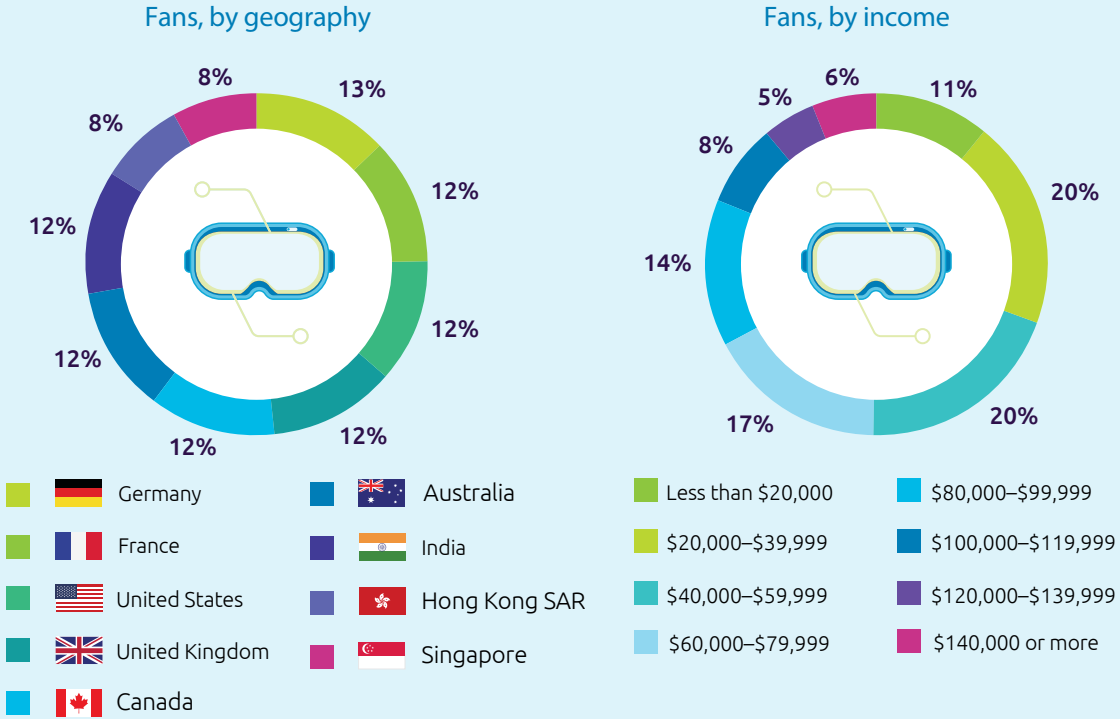
Conclusion

This research has laid out the benefits that organizations can reap by appropriately deploying emerging technologies to not only enhance fan experience but also to attract more fans. The learnings from this research can be extended to other sectors as well, where organizations are constantly trying to attract, retain, and engage with consumers in unique ways, be it through getting the attention of more consumers, or converting regular consumers to more "avid or loyal consumers" through personalized, customized, and engaging experiences, increasingly enabled through digital technologies. Retailers, public sector organizations, the automotive sector, and financers in particular stand to gain from imbibing the learnings of engaging with fans into their customer interactions.

People are passionate about sport. And with today's emerging technologies, the sports industry and its major players have an exciting opportunity to make that relationship with fans even stronger – building brand value and driving new avenues of growth. But, to realize that opportunity, they will have to change the way they play the technology game. They need a laser-like focus on the user experience, a strategy that targets the most attractive and avid fans, a culture that embraces disruption and innovation, and an acceleration in the digital and data capabilities of their people. That is what it will take to be a game changer.

Research Methodology

We surveyed over 10,000 fans who regularly watch and follow top sports globally.

Fans, by geography

8%
13%
8%
12%
8%
12%
12%
12%
12%
12%
12%

Legend:
- Germany
- France
- United States
- United Kingdom
- Canada
- Australia
- India
- Hong Kong SAR
- Singapore

Fans, by income

6%
5%
11%
8%
20%
14%
20%
17%

Legend:
- Less than $20,000
- $20,000–$39,999
- $40,000–$59,999
- $60,000–$79,999
- $80,000–$99,999
- $100,000–$119,999
- $120,000–$139,999
- $140,000 or more

Fans, by area of residence

13%
52%
35%

Legend:
- Urban
- Suburban
- Rural

Fans, by age

7%
16%
11%
20%
13%
19%
15%

Legend:
- 18–27 years
- 28–35 years
- 36-43 years
- 44–51 years
- 52–60 years
- 61–70 years
- Above 70 years

We also interviewed over 20 athletes, coaches, experts from sports organizations and tech in sport startups.

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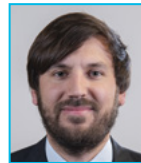
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Raphael has an extensive background in management consulting across a diverse range of industries, with a focus on customer engagement and digital transformation issues. He developed a strong expertise on how to enhance fan experience and sport performance with new technologies.

About the Capgemini Research Institute

The Capgemini Research Institute is Capgemini's in-house research center. The Institute publishes research on the impact of digital technologies on large traditional businesses. The team draws on the worldwide network of Capgemini experts and works closely with academic and technology partners. The Institute has dedicated research centers in India, the United Kingdom, and the United States. It was recently ranked Top 1 in the world for the quality of its research by independent analysts. Visit us at **www.capgemini.com/researchinstitute/**

Meet our in-house Capgemini sports stars

Amanda Ouedraogo

Image source: ACU athletic

1. Sport played: Track and Field, event -Triple jump
2. Highlight/achievement: 2-times-NCAA- National Champion and record older; 6-times-NCAA All-America, Multiple times France National Champion.
3. Role in Capgemini: Senior Application Consultant / Senior Business Analyst

Jonathan Laugel

Photo credit: INIGO BROTHERS

1. Sport played: Professional rugby 7 player
2. Highlight/achievement: 2016 Olympian, now focusing on the 2020 and 2024 Olympic games
3. Role in Capgemini: I&D Business Analyst, Sports expert

Ganesh Pedurand

Image source: Zimbio

1. Sport: Swimming
2. Highlight/achievement:

   – In the French National team for 10 years (Senior) /
   – French National Champion 6 times (Senior) /
   – Silver medal in Mediterranean Games /
   – Silver medal in Youth Olympic games (Junior) /
   – European Champion (Junior)

3. Role in Capgemini: Junior consultant in Capgemini Invent – Energy, Utilities & Chemicals

Pape-Philippe Amagou

1. Sport played: Former professional basketball player
2. Highlight/achievement:
   4x France Champion, participated to the world cup 2010
3. Role in Capgemini
   Senior consultant for Capgemini Financial Services

Source: abf-online

JasmineYeong Nathan

1. Sport played: Tenpin Bowling
2. Highlight/achievement:

   – 44th QubicaAMF Bowling World Cup Champion, Ladies Division, 2008
   – Singapore National Olympic Council (SNOC), Sportswoman of the Year, 2009

3. Role in Capgemini: Management Consultant, Capgemini Invent, Singapore

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Hemlata Saini

1. Sport played: 24 hours ultra-runner for Indian team
2. Highlight/achievement:

   – Gold medalist in India for 24 hours running.
   – Represented India in 2018 IAU 24 hours Asia and Oceania Championship in Taiwan (Taipei) and recently have represented India IAU 24 Hours World championship which held in France (Albi) on 26-27 Oct and represented Capgemini as its proud mascot in world Championship.

3. Role in Capgemini: Working in Bangalore as an associate consultant

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Arnaud Flanquart

1. Sport : Athletics / High Jump
2. Highlight/achievement: silver medalist French championship (U17)
3. Role in Capgemini: Principal in citizen services Capgemini Invent – Head of tech for sport France

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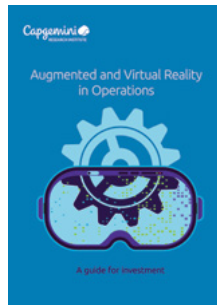With Artificial Intelligence:
The New Frontier In
Digital Security

Does Blockchain Hold The Key
To A New Age Of Supply Chain
Transparency And Trust?:
How Organizations Have
Moved From Blockchain Hype
To Reality

5G in Industrial Operations: How
Telcos and Industrial Companies
Stand to Benefit

Smart Talk:
How Organizations and
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Augmented and Virtual
Reality in Operations : a guide
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The Secret to Winning Customers'
Hearts with Artificial Intelligence:
Add Human Intelligence

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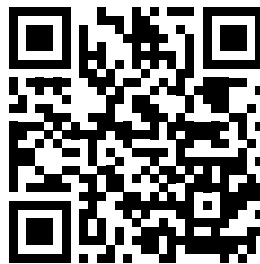
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